

Anno Era Salutis Christianae. 1651
SYNOPSIS COMPENDIARIA.

OR,
**A brief Description of the year of
 humane Redemption M.DC.LI.**

<i>wherein are numbered from</i>	<i>years</i>
The Creation	By the Oriental and Greek Christians 7159
By the Jews, Hebrews, & later Rabins	5411
The African Christians	<i>Era Martyrum</i> 1367
The Turkish Hegyra or Mahomet's flight	1060
The Astronomers Epocha of Nabonassar	ag 2399
Of Alexander's death	ag 1974

<i>Being the yeere from</i>	
The Bissextile or Leap yeere	3
The constitutio of the Calender by <i>Julius Caesar</i>	1695
The Reformation thereof by <i>Gregorius XIII.</i>	69
The Italian Period invented by <i>Scaliger</i>	6364

Containing the apparent Motions of the Sun and Moon, together with their Configurations, deduced from the Ephemerides of *Eichstadius*, being the best now extant.

Together with a full and absolute description of two Eclipses of the earth happening this year (though not apparent in our European world) after a new method, hitherto unpractised by any English yeerly writer.

Wherein is added a short Astronomical discourse, *De Mercurio in sole videndo*

Accommodated to the Horizon of LONDON, whose Pole is distant from the Equator Northward 51° 31' and from the Meridian of *Wraniburg* Westward 129° 30'

By **JEREMY SHAKERLEY** *Philomath.*

Supra rellus Sydera donat. Boeth. de Cons. Philos.

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CSIP 36

Vulgar Notes and movable Feasts for the

yeere			1 6 5 1.			0		
New Accompt.						Old Accompt.		
11	31	18	The Golden number.	8	18	0	3	0
01	21	8	The Circle of the Sun.	8	8	0	1	0
0	21	18	The Epact.	8	8	0	0	21
0	21	4	The Roman Indiction.	4	4	0	1	21
8	21	8	The Dominicall Letter	A	A	0	1	8
January	326	Septuagesima	7	0	February	52		
February	16	Quadragesima	0	0	February	26		
March	30	Easter day	0	1	April	92		
May	8	Ascension day	1	1	May	183		
May	18	Whitsunday	1	1	May	28		
November	30	Advent Sunday	1	1	December	3		

The apparent time of the Suns ingresse into the
four Cardinal Signes according to

Eichhad			Kepler			Billialdus			Horrox		
D. H. M.			D. H. M.			D. H. M.			D. H. M.		
March	11	56	10	1	2	11	10	2	4	10	4
June	11	5	9	1	14	19	11	26	11	4	14
Septem.	12	19	10	12	21	10	12	30	11	19	16
Decemb.	11	17	3	11	8	11	11	7	53	11	8

These are the times of the years quarterly commencements, according to the opinion of some late Astronomers, amongst whom, what difference there is, may hereby be seen. And indeed the moments of the Suns ingresses are too little points to be precise in. The ground whereon it is thoroughly known to some who make these the Epochs for their Astrological calculations, would either silence their Authors, or silence, or oppose them upon other principles. A thing rather to be wished than expected amongst those who had no better venture in their decayed bottom, then be at the cost to have her rigg'd up for a new discovery.

A Table of the Equation of civill Dayes.

Degree	S	A	A	S	S	S	A	A	A	A	S	S
	m	m	m	m	m	m	m	m	m	m	m	m
0	4	5	6	0	7	5	4	12	11	0	10	12
3	mg	5	6	1	7	4	5	13	10	S	11	11
6	2	6	6	2	8	4	6	13	10	2	12	11
9	1	6	5	3	8	3	7	13	9	3	12	10
12	A	0	7	4	4	8	2	8	13	8	5	12
15		1	7	4	5	7	1	9	13	7	6	12
18		2	7	3	5	7	0	10	13	5	7	13
21		2	7	3	6	7	A	1	10	4	8	13
24		3	7	2	6	6	2	1	12	3	9	12
27		4	7	1	7	6	3	12	12	2	10	12
30		5	6	0	7	5	4	12	11	0	10	12

The Use.

The demonstrative principles of Astronomy have taught us, that time (although the common measure of seasons, and the flux of a moment, as quantity is of a point, yet notwithstanding) in the diurnall periods we ordinarily prefix it, is subject to inequality. The quantity whereof is exhibited in this Table, and may be found by the Sunnes place, with an areall ingression the signe in the head, and degree in the left side, for the common Angle shewes the equation in minutes of an houre, which according to the title A or S must be added or subtracted to or from the equall time, to make it apparent, but the contrary title must be used when the apparent time is to be reduced to the equal.

Example. Let the equal time be given January 20 1651. 3 ho. 3 min. P.M. At that time the Sun is by the Calendar found to be in 49th deg, which gives the equation 12 min. to be subtracted. So the equal time reduced to the apparent is 3 ho. 23 min. P.M.

Epocha mediorum motuum
In meridie Calendarum Januarii, & Horizonte

Londinensi, An. 1651. Currente, Stylo

Nullum iuxta Tabulas.

Rudolphinas

Philolinas

	S	O	I	I	S	O	I	I
Longitudo Solis ab Aequino	9	20	50	32	9	20	50	18
Apogaeum Solis (in Averno)	3	6	35	30	3	6	22	50
Longitudo primae Aries	10	28	19	30	10	28	19	33
Planities Zodiaci (Eon)	10	23	31	42	10	23	31	53
Longitudo Saturni	3	10	10	45	3	10	9	4
Apheelum Saturni	8	27	6	40	8	27	34	58
Noctis Boreae Saturni	3	21	59	32	3	20	12	46
Longitudo Jovis	7	28	51	28	7	28	55	0
Apheelum Jovis	6	7	31	20	6	9	15	39
Noctis Boreae Jovis	3	5	28	54	3	8	57	55
Longitudo Martis	5	7	50	13	5	7	50	36
Apheelum Martis	4	29	55	42	5	0	53	35
Noctis Boreae Martis	1	17	17	40	1	17	24	43
Longitudo Veneris	3	1	30	14	3	1	30	57
Apheelum Veneris	10	2	19	24	10	6	50	22
Noctis Boreae Veneris	2	13	39	55	2	14	20	47
Longitudo Mercurii	9	1	28	45	9	1	28	50
Apheelum Mercurii	8	14	17	9	8	13	4	40
Noctis Boreae Mercurii	1	13	36	24	1	13	50	20
Longitudo Lunae	5	17	59	20	5	18	0	36
Apogaeum Lunae	3	14	16	47	3	13	23	9
Noctis Boreae Lunae	1	4	46	18	1	4	25	24

Qui horum pulchritudine delectari Deas pu-
 laverunt, sciant quanto his Creator eorum spec-
 ciosior est. A magnitudine enim speciei & Crea-
 turae cognoscitur poterat Creator horum vi-
 deri.

Sap. cap. 13.

January hath xxvi. dayes.

Left quarters 4 day 15 min past 8 at night.

New MacOne 11 d by 5 5 min. p2ft loose.

First quart 18 day 18 mm past 11 before noon.

Full Moon 26 day 54 min past 3 afternoon.

1	a	Circumcision	21	23	42	43	3	56	2	20	38	1	0
2	b	In 10 31	22	24	29	23	14	2	102	5	10	2	
3	c	24 3 16	23	25	07	24	2	19	3	7	21	13	5
4	d	Eclesphar	24	27	20	15	1	14	3	2	58	14	0
5	e	2 after Christ	25	28	3	28	0	10	2	0	37	14	3
6	f	Epiphania	26	29	17	5	1	14	5	2	14	16	h
7	g	Juliana	27	30	1	8	2	14	5	2	39	10	c
8	a	Erharous	28	31	15	37	3	16	5	2	45	18	D
9	b	15 8	29	3	0	28	4	7	5	2	48	10	c
10	c	3 3 4	30	34	5	40	4	47	2	2	47	20	f
11	d	Hyginus	1	35	0	56	4	58	3	0	53	21	g
12	e	f. arr. Epiph	2	36	15	8	4	51	2	2	58	22	h
13	f	Hilarius	3	37	1	3	4	25	2	2	56	23	b
14	g	Felix	4	38	15	35	3	42	1	1	56	24	c
15	a	8 5 1	5	39	29	38	2	47	1	1	57	25	d
16	b	Marcell	6	40	13	12	1	45	2	2	58	26	e
17	c	Anthoni	7	41	26	18	0	37	2	2	51	27	f
18	d	Prisca	8	42	9	20	0	30	3	3	52	28	g
19	e	2 aft Epiph	9	43	21	21	1	33	4	4	53	29	h
20	f	Pab. feb	10	44	3	28	2	31	4	4	54	30	b
21	g	Agnera	11	45	15	25	3	23	4	4	55	31	d
22	a	Vincent	12	46	27	17	4	35	5	5	56	32	e
23	b	Terme begins	13	47	9	8	4	33	6	6	57	33	f
24	c	Timoth	14	48	21	14	5	53	4	4	29	3	f
25	d	Conver. Paul	15	49	2	58	4	59	3	3	53	4	g
26	e	Septuages	16	49	5	0	3	52	3	3	50	5	h
27	f	4 7 7	17	50	27	12	4	31	2	2	24	6	b
28	g	19 32	18	51	9	29	3	57	1	1	45	7	c
29	a	2 8 56	19	52	21	35	3	12	1	1	17	8	d
30	b	1 delgunda	20	53	4	30	2	17	1	1	49	9	e
31	c	2 7 16	21	53	17	16	1	15	1	1	8	10	f

February hath xxviii. dayes.

Last quarter 3 day, 7 min. past 8 at morne.

New moone 9 day, 25 min. past 11 at night.

First quarter 17 day, 39 min. past 5 at morne.

Full moone 25 day, 59 min. past 8 at morne.

Old account.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
1	h 8 30	22	54	0	14	0	8	1	29	11	g																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

March hath xxxi. dayes.

Last quarter 4 day, 48 min. past 4 afternoone.
 New moone 11 day, 28 min. past o before noone.
 First quarter 19 day, 51 min. past midnight precedent.
 Full moone 26 day, 19 min. past n. at night.

Old Account. 10 X 10 m 10 MA 10 V. 10 Ac

1 D	h 7 55 8	20	59 10	27	0	57	29	38	11	g
2 C	3 in Lent	21	59 23	28	33	8	29	45	12	h
3 f	4 10 10 f	22	59 7	21	13	11	0	16	13	b
4 g	Adrianus	23	58 21	20	14	4	0	56	14	c
5 a	18 33	24	58 5	23	4	44	1	39	15	d
6 b	Frideline	25	57 19	30	39	6	2	16	16	e
7 c	Perpetua	26	57 3	31	58	5	1	36	17	f
8 d	Q 20 17	27	56 18	36	4	54	2	37	18	g
9 e	4 in Lent	28	56 2	39	4	19	2	14	19	h
10 f	Q 7 2 X	29	55 17	31	13	27	1	32	20	b
11 g	h 8 5 8	0	55 1	45	2	25	0	40	21	c
12 a	Gregorius	1	54 15	46	1	14	29	50	22	d
13 b	Euphrasia	2	53 29	20	05	9	19	10	23	e
14 c	4 10 25 f	3	52 12	32	1	11	48	50	24	f
15 d	Q 15 36	4	52 25	20	2	18	38	46	25	g
16 e	5 in Lent	5	51 7	48	3	11	29	9	26	h
17 f	Gertrude	6	50 20	0	4	3	19	16	27	b
18 g	Q 25 34	7	49 1	59	4	39	28	5	28	c
19 a	Iosephus	8	48 13	51	5	2	0	25	29	d
20 b	Q 12 8 X	9	47 25	40	5	14	1	8	30	e
21 c	Benedict	10	46 7	34	5	13	1	35	31	f
22 d	h 8 27 8	11	45 19	32	4	16	1	49	32	g
23 e	Palmenty	12	44 1	45	4	25	1	50	33	h
24 f	4 10 18	13	43 14	11	3	43	1	34	34	b
25 g	Annun. Mar.	14	42 26	54	2	49	1	2	35	c
26 a	Casius	15	41 9	53	1	45	0	37	36	d
27 b	Q 11 18	16	39 23	90	M	34	29	48	37	e
28 c	Q 2 42 X	17	38 6	39	1	40	28	42	38	f
29 d	Eustach.	18	37 20	32	1	53	28	10	39	g
30 e	Q 11 18	19	36 4	16	3	51	27	37	40	h
31 f	Q 23 50 X	20	34 18	14	3	59	28	4	41	b

Aprill hath xxx. dayes.

Last quarter 2 day 14 min. past 11 at night.

New Moon 9 day at 10 at night

First quarter 17 day 19 min. past 7 at night.

Full Moon 25 day 55 min. past 10 before noon

	Old Account.	to V.	to W.	MA	to V.	to W.
1	8 18 5	21	33	2	16	4
2	Mar. Beg p.	22	31	16	22	5
3	9 54 7	23	30	0	28	5
4	Ambrosius	24	29	14	37	5
5	8 7 2	25	27	28	44	4
6	after Easter.	26	25	12	X	40
7	E clippis	27	24	26	46	2
8	12 16 X	28	22	10	V	33
9	6 46 V	29	21	24	9	0
10	9 33 5	0	19	7	0	S
11	24 9 21 I	1	17	10	3	I
12	Johus	2	15	3	II	14
13	after Easter	3	14	13	4	3
14	Tiburtius	4	12	27	54	4
15	Olymp	5	10	9	55	4
16	Termes begins	6	8	21	48	5
17	25 46 X	7	6	3	Ω	38
18	Valelian	8	4	15	29	5
19	24 0 V	9	2	27	28	4
20	after Easter	0	0	9	m	39
21	16 27 5	10	58	22	7	3
22	8 21 I	11	56	4	=	54
23	Georg us	12	54	18	3	I
24	9 56 m	13	52	1m	34	0
25	Mark Evang.	14	50	15	25	I
26	9 30 X	15	48	29	34	2
27	after Easter	16	46	13	f	55
28	Vicalis	17	44	28	23	4
29	14 39 0	18	41	12	v	51
30	11 17 5	19	39	27	15	8

May hath xxxi. dayes.

Last quarter 2 day, 45 min. past 4 at morning
 New Moone 9 day, 47 min. past 10 before noon
 First quarter 17 day, 55 min. past noon
 Full Moone 24 day, 55 min. past 7 at night
 Last quarter, 31 day, 40 min. past 10 before noon

Old Account.	u	s	d	m	sec	h	m	sec	h	m	sec
1 b Phil. & Jacob	20	37	14	28	3	7	27	27	11	1	1
2 c h 11 18	21	34	25	32	4	41	28	11	1	1	1
3 d Inuent. Cr.	22	32	5	25	4	0	28	11	1	1	1
4 e Rogation	23	30	23	7	3	6	29	10	1	1	1
5 f Corke d	24	27	6	38	2	2	29	10	1	1	1
6 g Joh. Port. Cat.	25	25	19	58	0	5	1	29	10	1	1
7 a 15 6 38	26	23	3	9	0	20	29	10	1	1	1
8 b Ascension	27	20	16	7	1	20	28	10	1	1	1
9 c 8 3 46	28	18	28	5	2	35	27	10	1	1	1
10 d 14 39	29	15	14	26	3	30	26	10	1	1	1
11 e 6 at Easter	30	13	23	46	4	13	26	10	1	1	1
12 f Terme ends	1	10	5	58	4	45	25	10	1	1	1
13 g Servatius	2	8	17	58	5	5	25	10	1	1	1
14 a 16 3 II	3	5	29	52	5	12	25	10	1	1	1
15 b Sophia	4	3	14	43	5	4	26	10	1	1	1
16 c 12 58	5	0	23	34	4	42	26	10	1	1	1
17 d 25 25	6	57	3	31	4	9	27	10	1	1	1
18 e Whitsunday	7	55	17	39	3	25	27	10	1	1	1
19 f Richard	8	52	0	4	2	30	28	10	1	1	1
20 g 5 19	9	49	12	50	1	25	28	10	1	1	1
21 a 26 16	10	47	26	0	0	14	28	10	1	1	1
22 b 30 58	11	44	9	37	0	57	28	10	1	1	1
23 c Lendenius	12	41	23	39	2	9	27	10	1	1	1
24 d 13 51	13	39	8	5	3	16	17	10	1	1	1
25 e Trinity fund.	14	36	22	49	4	9	26	10	1	1	1
26 f Meda	15	33	7	43	4	46	25	10	1	1	1
27 g 4 12	16	30	22	38	5	4	24	10	1	1	1
28 h 7 12	17	28	7	25	5	3	24	10	1	1	1
29 b 5 45	18	25	21	58	4	45	25	10	1	1	1
30 c Terme begins	19	22	6	9	4	1	25	10	1	1	1
31 d Petronella	20	19	20	1	3	9	26	10	1	1	1

June hath xxx. dayes.

New moone the 8 day, 16 min. past midnight preceed.
 First quarter 16 day, 16 min. past 3 at moone.
 Full moone 23 day, 10 min. past 3 at moone.
 Last quarter 29 day, 28 min. past 6 after moone.

Old account.	10	II	10	V	6	MD	10	V	IN	40
1 after Trin.	20	16	3	35	2	2	2	8	11	2
2 f h 14 54 5	21	18	16	50	1	S	6	17	39	1 b
3 d Erasimus	22	11	29	50	0		9	27	57	13 e
4 a 23 16 7	23	8	12	39	1		16	27	138	14 d
5 b Bonifacius	24	5	12	II	17		12	27	141	15 c
6 c 9 52 2	25	12	7	46	3	45	27	7	16	f
7 d Wolstan	25	59	20	44			26	25	17	g
8 e 2 after Trin.	26	56	2	20	16	4	33	25	39	18 a
9 f 12 19 8	27	54	14	22	4		54	24	58	19 b
10 g Onophris	28	8	12	6	21	5	D	24	25	20 c
11 h 23 18 5	29	48	8	8	15	4	56	24	7	21 d
12 b Basil	30	45	20	m	6	4	37	24	3	22 e
13 c Cyrill	1	42	1	58	4		17	24	13	23 f
14 d Vale ius	2	39	13	55	3	25	24	37	24	24 g
15 e 3 after Trin.	3	36	26	22	2	35	25	10	25	25 a
16 f Rolandus	4	33	8	23	1	36	25	47	26	26 b
17 g h 16 47 5	5	30	21	m	5	OM	30	26	24	27 c
18 a Terme ends	6	28	4	10	0		39	26	53	28 d
19 b Gervase	7	25	17	44	1	48	27	9	29	29 e
20 c Sylverius	8	22	1	47	2	53	27	5	30	30 f
21 d 14 49 7	9	19	16	47	3	59	26	37	31	31 g
22 e 4 after Trin.	10	16	1	11	4	31	25	49	32	32 a
23 f 15 36 2	11	13	16	19	4	D	54	24	54	33 b
24 g John Baptiste	12	10	1	34	4	58	24	2	4	34 c
25 a 6 50 II	13	7	16	41	4	39	23	28	5	35 d
26 b 22 55 5	14	4	1	31	4	22	23	17	6	36 e
27 c 7 Sleepers	15	1	15	59	4	11	23	30	7	37 f
28 d Leo Epil.	15	59	0	12	2	9	24	1	8	38 g
29 e Peter Apost.	16	56	13	37	1	S	24	41	9	39 a
30 f h Oriental	17	53	26	50	0		25	21	10	40 b

July hath xxxi. dayes.

New moone 7 day, 8 min. past 3 after noon. 11
First quarter 10 day, 24 min. past 4 after noon. 12
Full moone 15 day, 8 min. past 10 before noon. 11
Last quarter 22 day, 1 min. past 5 before noon. 12

Old Account.

1	G	h 18 35	18	50	9	42	14	25	56	10	C
2	a	Vinif. Mar.	19	47	22	38	2	16	26	18	D
3	b	20 56	20	44	14	44	3	10	26	10	E
4	c	Ulricus	21	41	16	38	3	54	26	18	F
5	d	Anselmus	22	39	29	5	4	25	10	54	G
6	e	after Trin.	23	36	11	84	4	29	29	16	H
7	f	23 21	24	33	23	Ω	74	18	24	33	I
8	g	Chilanus	25	30	5	5	24	54	23	50	J
9	a	Cyrillus	26	27	16	56	4	10	23	11	K
10	b	7 Brethren	27	24	28	10	4	5	24	42	L
11	c	Pius	28	22	10	54	3	24	23	29	M
12	d	24 52 II	29	19	22	46	2	34	24	31	N
13	e	7 after Trin.	30	16	4	55	1	37	22	48	O
14	f	14 57	1	14	17	19	0	34	23	20	P
15	g	Divil Apolt.	2	12	29	19	0	33	23	54	Q
16	a	20 28	3	8	12	56	1	39	14	33	R
17	b	Alexus	4	6	26	22	2	43	23	3	S
18	c	Rofina	5	3	10	17	3	42	25	34	T
19	d	Dhog. days beg.	6	1	24	42	4	42	25	38	U
20	e	8 after Trin.	6	58	9	33	4	38	25	13	V
21	f	18 38 m	7	55	24	40	4	36	24	32	W
22	g	Mary Magd.	8	53	9	58	4	46	23	36	X
23	a	Apollonia	9	50	25	14	4	13	22	43	Y
24	b	Chriftina	10	47	10	16	3	22	22	2	Z
25	c	James Apolt.	11	45	24	56	2	19	21	4	AA
26	d	Anna	12	42	9	10	1	19	21	50	AB
27	e	9 after Trin.	13	40	22	55	0	13	22	15	AC
28	f	16 0	14	37	6	13	1	11	21	11	AD
29	g	Beatrix	15	35	19	7	2	1	23	30	AE
30	a	24 Ω	16	32	1	40	3	1	24	7	AF
31	b	Germai us	17	30	13	58	3	58	24	32	AG

August hath xxxi. dayes.

New Moone 6 day, 19 min. past 6 afternoone.

First quarter 14 day, 40 min. past 2 a morne

Full Moone 20 day, 32 min. past 5 afternoone.

Last quarter 27 day, 27 min. past 6 afternoone.

		I. O. N. I. O. II.		O. D. A. I. O. V. I. O. A. C.			
1	Edmund day	18	27	26	6	4	32 24
2	23 35 55	19	25	8	6	4	53 24
3	26 after Trin	20	23	20	2	5	2 24
4	Mattharch	21	20	1	5	6	58 24
5	Ofwaldas	22	18	13	5	14	41 23
6	Satus	23	16	25	4	7	11 21
7	21 14 7	24	13	8	4	5	29 21
8	Roman	25	11	19	4	8	38 21
9	21 19 01	26	9	1	3	8	40 21
10	Laurencius	27	7	14	1	0	37 20
11	22 58 51	28	5	26	4	0	30 21
12	Clara	29	3	9	2	6	36 21
13	Hippolyt	30	0	2	2	2	40 22
14	Bulch	1	0	38	5	48	37 22
15	Assump Mar.	2	56	19	33	4	21 23
16	Boch	3	54	3	44	4	53 23
17	2 after Trin	4	52	18	2	5	6 24
18	Helena	5	50	3	15	4	59 23
19	Sebalde	6	48	18	2	4	32 23
20	210 51 11	7	46	3	31	3	48 22
21	Thomas	8	43	18	3	2	43 21
22	24 53 55	9	43	3	15	1	42 20
23	Zacharis	10	41	17	3	0	15 20
24	Bartholi Apost	11	39	1	26	1	0 20
25	Mudovicus	12	37	14	54	2	9 20
26	Sebhard	13	36	27	53	3	5 20
27	Dog dayes end	14	34	10	II	3	58 21
28	Augustine	15	32	22	49	4	36 22
29	Dec. Jo Bapt	16	30	4	54	5	1 22
30	25 12 4 m	17	28	16	50	5	23
31	14 after Trin	18	27	18	43	5	8 23

September hath xxx. dayes.

New Moon 4 day, 12 min. past 11 at night.
 First quart 12 day, 1 min. past 11 before noone.
 Full Moon 19 day, 2 min. past 2 at noone.
 Last quarter 25 day, 2 min. past 11 before noone.

Old account.

		18	26	10	38	4	52	23	13	19	8
1	Agidius	18	26	10	38	4	52	23	13	19	8
2	Veronica.	19	24	22	my	29	4	23	22	55	19
3	h 26 6	20	23	4	28	3	47	23	22	23	13
4	Theodosius	21	22	16	34	2	52	45	23	19	2
5	23 59	22	20	28	48	1	54	26	38	19	5
6	Magnus	23	19	11	11	0	48	20	11	16	8
7	15 after Trin.	24	17	23	45	0	21	19	13	19	1
8	Nat. Mar.	25	16	6	m	29	1	29	19	24	19
9	Gorgon	26	15	19	25	2	34	19	1	23	19
10	22 52	27	13	2	36	3	34	29	40	20	19
11	11 5	28	12	16	4	4	21	20	19	24	19
12	Tobias	29	11	29	43	4	55	10	56	12	19
13	Docther	0	10	13	43	5	14	21	38	12	19
14	16 after Trin.	1	9	28	0	5	1	22	13	19	1
15	Nicodemus	2	8	12	33	4	15	22	29	25	19
16	Euphemia	3	7	29	19	4	9	22	25	25	19
17	Lanperc	4	6	12	5	3	43	21	55	27	19
18	26 12	5	5	26	49	2	5	20	15	28	19
19	h 27 25	6	4	14	22	0	47	20	13	29	19
20	Faulst	7	3	25	38	0	31	19	0	23	19
21	Matth. Apost.	8	2	14	31	1	46	18	50	0	19
22	Mauritius	9	2	22	51	2	54	18	37	3	19
23	Elara	10	1	6	53	3	50	18	42	0	19
24	Samuel	11	0	18	47	4	31	19	4	4	19
25	27 0	12	0	1	19	5	0	19	13	5	19
26	Cyprianus	12	59	13	16	5	15	20	11	6	19
27	Colm. Dam.	13	58	25	12	5	17	10	40	1	19
28	12 after Trin.	14	58	7	4	5	3	19	16	8	19
29	Michael Arch.	15	57	18	23	4	46	34	27	0	19
30	16 56	16	57	0	42	4	4	17	44	0	19

October hath xxxi. dayes.

New moone 4 dayes 47 min past 11 after noone.
 First quarter 11 dayes 15 min past 6 at night.
 Full moone 18 dayes 1 min past 11 after noone.
 Last quarter 25 dayes 19 min past 7 after noone.

Old style 1600. New style 1601.

1 a Regimius	19 56	12 24783	11 21 35 11	b
2 b Leodeger	18 58	12 24 29 3	14 21 12 11	e
3 c 18 18 20	19 55	7 24 1	9 20 9 13	f
4 d Francisus	20 55	20 30	6 19 2 48	g
5 e 19 after Trin.	21 55	2 56 1	11 19 1 15	h
6 f Fides	22 54	16 5 2	19 18 1 16	i
7 g 21 1 7	23 54	19 2 3	21 17 3 17	k
8 h Helagus	24 54	14 57 4	13 17 47 18	d
9 i Dionisius	25 54	26 40 4	5 17 59 19	e
10 k 24 14 4	26 54	10 30 5	12 18 30 20	f
11 l Burchard	27 54	24 29 5	16 19 11 21	g
12 m 20 after Trin.	28 54	8 36 5	0 19 51 22	h
13 n 20 30 2	29 53	22 46 4	26 20 30 23	i
14 o Calixtus	00 53	6 3	35 20 53 24	k
15 p Hedewig	18 54	21 26 2	32 20 48 25	d
16 q Gallus	20 54	5 42 1	19 20 35 16	e
17 r 2 17 38 m	30 54	19 51 0	3 19 55 27	f
18 s Luke Evang.	42 54	30 49 1	15 19 6 28	g
19 t 21 after Trin.	51 54	17 54 2	26 18 34 29	h
20 u 28 56 20	6 54	0 53 3	27 17 34 30	i
21 v Ursula	27 55	14 0 4	14 17 10 31	k
22 x Cordula	8 55	26 43 4	49 17 17 32	d
23 y Term. begins	9 55	29 7 5	9 17 11 33	e
24 z 4 38 10	10 55	5 16 5	14 17 36 34	f
25 a Crispinus	11 56	13 13 5	8 18 7 35	g
26 b 22 after Trin.	12 56	15 3 4	45 18 42 36	h
27 c 8 24 m	13 57	26 5 4	14 19 16 37	i
28 d Simon & Jude	14 57	8 43 3	26 10 45 38	k
29 e 4 4 San	15 58	20 42 2	34 20 11 39	d
30 f Nikolus	16 58	22 48 1	42 20 9 40	e
31 g Wolffg. ing	17 59	16 50	25 19 68 41	f

November hath xxx. dayes.

New moon 3 day, 12 min. past at moon.

First quarter Holiday, 32 minutes past 7 at home.

Full moon 17 day, 10 min past 4 and more.

Lait qu'on a 25 days, 13 min. plus 4 au moment.

Old Account. of 100 m 100 20 MA, 0 Y, N

1	g	All Saints	18	59	28	21	0	45	19	28	11	1
2	g	23 after Trin.	20	0	11	m	3	2	55	18	29	12
3	f	Theophyl.	21	0	25	7	3	3	61	7	55	13
4	g	h 29 5	22	1	8	7	5	2	55	17	7	14
5	a	Powd. Conf.	23	2	23	11	4	3	39	16	13	15
6	b	Leonard	24	3	17	3	5	D	2	16	14	16
7	c	Florenine	25	3	21	16	5		10	16	15	17
8	d	21 15 10	26	4	15	23	0	4	59	16	16	18
9	e	24 after Trin	27	5	19	40	4		29	17	17	19
10	f	2 17 31	28	6	3	45	3		42	18	18	20
11	g	Martin. Bish.	29	6	17	44	2		44	18	19	21
12	a	2 28 42	30	7	1	39	1		35	19	19	22
13	b	Brice	31	8	15	26	0	S	22	19	24	23
14	c	Frederick	32	9	29	7	0		51	19	24	24
15	d	Leopold	33	10	12	38	2		1	20	25	25
16	e	25 after Trin.	34	11	25	5	0	3	3	17	25	26
17	f	2 17 20	35	12	9	9	3		55	17	26	27
18	g	Gelasius	36	13	22	3	4		33	16	27	28
19	a	Elizabetha	37	14	4	41	4		56	15	28	29
20	b	h 28 43	38	15	17	3	5	D	5	15	28	30
21	c	Quat. Mar.	39	16	29	13	5		11	15	28	31
22	d	21 19 0	40	17	11	9	4		43	15	29	32
23	e	26 after Trin	41	18	23	0	4		12	16	30	33
24	f	2 28 49	42	19	4	58	3		31	16	31	34
25	g	Catharine	43	20	16	37	2		42	17	31	35
26	a	Conrade	44	22	28	3	5	1	44	17	31	36
27	b	2 17 31	45	13	10	49	0		42	18	32	37
28	c	Term. ends	46	24	23	19	0	M	25	18	31	38
29	d	Saturnine	47	25	6	13	1		32	28	32	39
30	e	Andr. Adv.	48	27	19	34	2		37	28	32	40

December hath xxxi. dayes.

New moone 2 day, 20 min. past 5 at night.
 First quarter 9 day, 11 min. past 10 b. fore noon.
 Full moone 16 day, 47 min. past 8 at night.
 Last quarter 25 day, 30 min. past 1 at morn.

Old Account.		1 ^o P.	1 ^o F.	10 MA.	10 V.	10 N.	Ac
1 f	h 28 13 ☽	19	28 3	20 3	35 17	39 11	b
2 g	Andreas	20	29 17	30 4	20 16	49 12	c
3 a	Cassianus	21	30 1	57 4	49 15	55 13	d
4 b	Barbara	22	32 16	36 5	12 5	11 14	e
5 c	4 22 2 f	23	33 1	19 4	53 14	45 15	f
6 d	Nicholas	24	34 15	58 4	26 14	42 16	g
7 e	2 in Advent	25	35 0	25 3	41 15	1 17	a
8 f	Concep. Mar.	26	37 14	39 2	43 15	32 18	b
9 g	Joachim	27	31 28	37 1	38 16	18 19	c
10 a	8 10 50 ☾	28	35 13	16 0	27 16	59 20	d
11 b	Damasus	29	41 23	49 0	44 17	20 21	e
12 c	Epimachus	0 ^{yo}	42 9	6 1	52 17	48 22	f
13 d	Lucia	1	43 22	14 2	53 17	48 23	g
14 e	3 in Advent	2	45 5	11 3	43 17	29 24	a
15 f	9 10 16 ^{yo}	3	46 17	58 4	22 16	54 25	b
16 g	9 1 38 ^{yo}	4	47 0	36 4	47 16	9 26	c
17 a	Lazarus	5	49 13	2 4	59 15	22 27	d
18 b	Christopher	6	50 25	18 4	55 14	42 28	e
19 c	h 27 0 ☽	7	51 7	23 4	58 11	11 29	f
20 d	Julian	8	53 19	19 4	9 13	56 30	g
21 e	Thomas Apost.	9	54 1	9 3	31 13	54 31	a
22 f	4 25 55 f	10	55 12	56 2	43 14	7 32	b
23 g	Victor	11	57 24	46 1	48 14	32 23	c
24 a	Claupius	12	58 6	42 0	47 13	5 34	d
25 b	Nat. Dom.	13	9 18	33 0	17 15	41 24	e
26 c	Stephen	15	1 1	21 1	21 16	17 5	f
27 d	John Evang.	16	02 14	13 2	24 16	144 6	g
28 e	Innocents	17	3 27	33 3	21 16	59 27	a
29 f	8 25 42 ☾	18	4 11	19 4	7 16	55 28	b
30 g	David	19	6 25	36 4	40 16	28 29	c
31 a	Sylvester	20	7 10	17 4	57 15	42 30	d

A brief Description of the Ecclipses incident this year 1651.

*Tandem fit Sarculus arbor,
Quodq; ferire vides nubila, vimen erat.*

The plant becomes a tree,
And twigs in time confront the cloudes we see.

From such abject and contemptible beginnings, may the greatest attempts calculate their Nativities, and that Nation that now Lords it over the greatest part of the World, was once

Contempta, vilis, exul, incerti laris.

That science that may now be justly called the Mistress of Humanity, as bringing under its enquiries more secrets in Nature, and objects of an elevated understanding then any other, had but her cradle rudely framed of Chaldaicke and Arabick materials, who soiling her native beauties with the superstitious pigments of their own composition, left posterity a harder task to develope her of that glorious varnish. Yet such hath been her felicity, that she hath found those Nurses, who were not content to grope after future events by the motion of the Stars; but by a far more laudable attempt sought out, and happily found, the motions of the Stars from the rules of Art; thereby antedating appearances, and in their Tables giving a view of what the world was afterward to read in *Postscript*. To these endeavours, the Genius of this latter age hath been a principal motive; which casting off the yoke of barbarism, hath with more sincerity and less superstition (if we except some few Syderiall Enthusiasts) applied themselves to this noble studie: And with such success that the Vulgar have been amazed at their powerfull art, and being like other agents incapable of action beyond their proper Sphere of activity, have been too ready to impute to the revelations of spirits, those works of man-wit and industry they understand not.

But we shall bestow our short time, and narrow roomes better then in the filling it with confutations of these gross uncharitable opinions, nor doubt we but what we shall here present, as it may be usefull to some, so will it of many be gratefully accepted, as both in our weak endeavours, and the subject thereof manifesting in part the power of him from whom alone proceeds

Πάντα δεῖσις ἀνάδω, καὶ πᾶσι δωρημα τελείον.

This primary Planet the Earth which we inhabir, shall twice

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this year be in part deprived of the Suns illuminating presence, by the interposition of the opacous body of the Moon which about us performs her secondary course. Whereby it shall fall out that to those who live in the obscured parts of the earth, the Sun shall be in appearance darkned; And in regard there two interceptions of light fall out very near centrall to the earths inlightened Hemisphere, the one before the Sun come to his Apogeeum, the other after, there cannot be during this whole year, such a position of the Celestiall bodies, that the earths shadow may deprive the Moon of her Sun borrowed lustre.

The calculations of these do follow in their order, from the Inter and best Astronomical tables of *Bullialdus*, but reduced to the Meridian of London.

9. April 1651.

Sig. gr.
d. h.

The meane ϕ of \odot and \sphericalangle at London	9.	16.	01.	46"
The intervallum to be subtr.		6.	6.	51.
The true conjunction	9.	9.	53.	55"
The places of the Luminaries	0.	29.	43.	16.
The mean Anomalie of \odot	9.	21.	27.	14.
The mean Anomalie of \sphericalangle	8.	29.	12.	47.
The mean motion of \sphericalangle latitude	11.	25.	31.	2.
The true motion of \sphericalangle latitude	0.	0.	30.	50.
The true latitude of \sphericalangle , North			2.	37.
The Reduction Subtr.			0.	8.
The time of Reduction add			0.	13.
The time of ϕ corrected	9.	9.	54.	10.
The equation of time add			4.	36.
The apparent time of true ϕ	9.	9.	58.	46.
The hourly motion of \odot			2.	26
The hourly motion of \sphericalangle			33.	30
The hourly motion of \sphericalangle from \odot			31.	4
The semidiameter of \odot			16.	20
The semid. of \sphericalangle			16.	14
The semid. of the residual Circle			10.	16
The semid. of the Earths disc			58.	7
The semidiam. of the Penumbra			32.	34
The sum of the semid.		1.	30.	41
The difference of the semid.			25.	33

the

A Prognostication.

The Latitude of the D added to the semidiameter of the Penumbra is 35. 11" which being less then the semidiameter of the earth's disc, shews that the Penumbra is wholly contained upon the earth's disc

The scruple of half the duration considered } universally.	1.	30.	41
The scruples of half the centrall duration		58.	4
The scruples of half the Penumbra's continu- ance upon the earth's disc		25.	25
Time of half the universal duration	2	55	8
Time of half the Centrall duration	1	52	8
Time of half continuance of Penumbra		49	9
Therefore			

At sunrise	beginning	7	3	38
	Centrall Ecclips	8	6	38
	End	9	9	41
At sunsett	beginning	10	47	51
	Centrall Ecclips	11	50	54
	End	12	53	54

Thus far hath our Calculation run on in a general course; we come now to determine, and point out to the care of the observer, such places of the Ecclipsed earth, as shall become more notable by reason of some particular appearance of the Suns visible body: And these are seven: a perfect determination whereof according to the method of *Bullialdus* who following the steps of the excellent *Kepler*, the first Author of this curious speculation, hath lighted the way for posterity; hereafter follows each in their order.

I. A determination of the place where the Suns Ecclips appears central in the Nonagisme degree of the Eccliptick.

The time apparent at London in degrees	149	41
The Moons Latitude North	2	37
The height of the nonagisme degree	27	25
The point ascending	29	48
The Altitude of the North pole	14	0
The oblique ascension of the Horoscope	146	29
The right ascension of Mid-heaven	26	19
The right ascension of the Sun	27	43
The right ascension of Mid-heaven at London	177	23
To the difference in Longitude West	150	54
and supposing the Longitude of London	24	20
The Longitude of the place inquired is	233	26

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II. A determination of the place where the Ecclips begins at the Sun rising.

The time apparent at <i>London</i> in degrees	105	54
The right ascension of Mid heaven	133	36
The Moons Latitude South	1	12 ^h
The Altitude of the Nonagesime degree	86	43
The point ascending	29	43
The Altitude of the South pole	17	0
The oblique ascension of the Horoscope	31	11
The right ascension of Mid heaven	301	11
The difference in Longitude East	167	35
So the Longitude inquired	191	55

III. A determination of the place where the Sun ariseth centrally Ecclipsed.

The time apparent at <i>London</i> in degrees	121	39
The right ascension of Midheaven	149	21
The Moons Latitude South	2	21 ^h
The Altitude of the Nonagesime degree	87	40
The point ascending	29	43
The Altitude of the South pole	18	0
The oblique ascension of the Horoscope	31	21
The right ascension of Midheaven	301	21
The difference in Longitude East	152	0
So the Longitude inquired	176	29

IV. A determination of the place where the Ecclips ends at the Sun rising.

	0	1
The time apparent at <i>London</i> in degrees	137	25
The right ascension of Midheaven	165	7
The Moons Latitude North	0	23 ^h
The Altitude of the Nonagesime degree	89	8
The point ascending	29	43
The altitude of the South pole	19	0
The oblique ascension of the Horoscope	31	34
The right ascension of Midheaven	301	34
The difference in Longitude East	136	27
So the Longitude inquired	160	47

V. A

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V A determination of the place where the Eclips begins at the Sun setting.

The time apparent at London in degrees	161	58
The right ascension of Midheaven	189	40
The Moons Latitude North	8	57
The altitude of the Nonagesime degree	81	6
The point ascending	29	43
The altitude of the North pole	29	0
The oblique ascension of the Horoscope	214	3
The right ascension of Midheaven	124	3
The difference in Longitude West	65	37
So the Longitude enquired	318	43

VI. A determination of the place where the Sun setteth central Eclipsed.

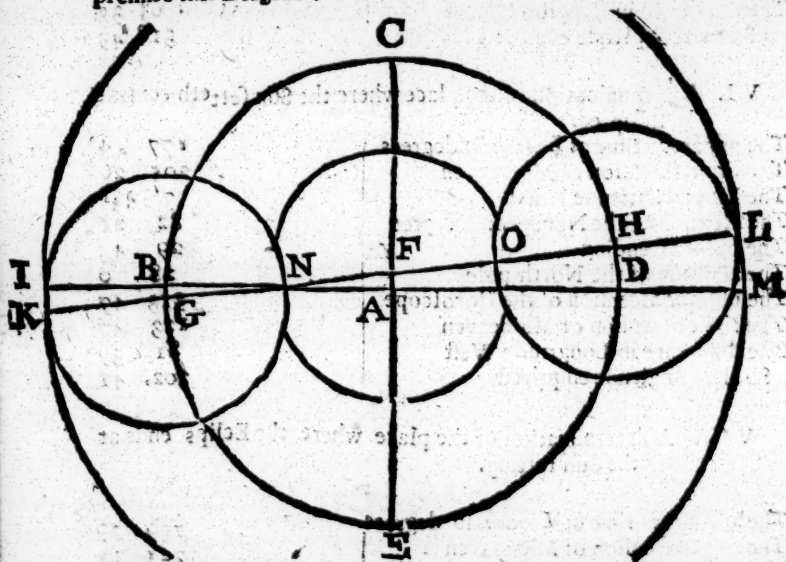
The apparent time at London in degrees	177	44
The right ascension of Midheaven	205	26
The Moons Latitude North	7	44
The altitude of the Nonagesime degree	82	21
The point ascending	29	43
The altitude of the North pole	28	0
The oblique ascension of the Horoscope	213	47
The right ascension of Midheaven	123	47
The difference in Longitude West	81	39
So the Longitude enquired	302	41

VII. A determination of the place where the Eclips ends at the Sun setting.

The apparent time at London in degrees	139	29
The right ascension of Midheaven	221	11
The Moons Latitude north	10	26
The altitude of the Nonagesime degree	83	24
The point ascending	29	43
The Altitude of the North pole	27	0
The oblique ascension of the Horoscope	213	38
The right ascension of Midheaven	123	31
The difference in Longitude West	97	40
So the Longitude inquired	286	40

By the former Calculations may be gathered the places of the earth wherein the several forementioned appearances happen. Briefly thus; The Eclips begins at the sunrise to them that live in Hoornse Islands, or something more Westward in the Pacificke sea. It ends the sun rising in the Sea *Lantchidol*, Southwest from *Nova Guinea*, and about 500 leagues South from the Islands of *Molucco*, near the Ile *Timore*. It begins the sun setting, in the Sea *del North*, about 100 leagues from the *Barmudas*, or summer Islands, toward *Port Rico* in the Ile of *Pearles*: and ends the sun setting in the gulfe of *Mexico* a little Eastward from *Rio de Palma*.

But to determine the passage of the Penumbra over the earths disc or illuminated superficies, give me leave for explication to premise this Diagram.



Wherein let *A* represent the center of the Earths disc or illuminated Hemisphere, *B C D E* the disc it self according to the quantity it would appear of in the heavens, if beheld from the Moon, being equal to the double of the Moons Horizontal Parallax. *B* the West part of the world reckoned from *A* according to the tract of the Zodiack, *D* the East, *C* the North pole of the Zodiack, *E* its South pole, So is *B D* the Zodiack, *C E* its axis drawn through *A* the place of the Eclips being $29^{\circ}.43' \gamma$. *I B* the semid. of the Penumbra, as also *K G*, *G N*, *O H*, *H L* these points being all situated

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situated in the Orbe of the Moon represented by the line *KL*. So that if you suppose *A* in every of the seven several appearances before mentioned to be the place of the Earth, to which the sun is perpendicular, the center of the Penumbra shall be in the first appearance in *F*, the second in *K*, the third in *G*, the fourth in *N*, the fifth in *O*, the sixth in *H*, and the seventh in *L*. And during its passage from *G* to *H*, the Centroll Eclipse continues. It enters upon the earth in the vast Pacifick Ocean East from the Cape or promontory of *Beagb*; then passing by the South of *Nova Guinea* over against the Ile of Saint *John*, Eclipseth the sun centrally in his rising. Then travelling North East, and crossing the Equinoctiall a little South from the Ile *Nadadores*, drawes towards New *Spaine*, and about 400 leagues East from the Ile de *S. Pedro* Eclipseth the Sun centrally in the very Nonagesime degree of the *Ecliptick* from the Ascendent, about five minuts before noone. From thence passing by the South part of *California*, enters upon New *Spaine*, and having past that *Isthmus* that divides *America Mexicana* from *Perviana*, enters upon the gulfes of *Mexico*, and lastly betwixt *Nimbre de dies*, and the Cape of *Florida*, a little West from *Jamaica*, the Center of the Penumbra takes her farewell of the Earth, the Sun then setting, all his light obstructed by the Moon, but onely what he gives at his edges.

Notwithstanding, those that live about *Virginia Florida*, *Nova Granada*, *California*, and on the South side *Hispaniola*, *Panama*, *Castilia del Ora* and places thereabouts, shall see the Sun in part Eclipse, according to their distance from that path which the Center of the Penumbra observes in her passage.

Yet nevertheless during all this time there is no place in the earth which shall behold the Sun totally Eclipse; for the apparent diameter of the Sun, being greater then that of the Moon, there will still appear a bright edge encircling the Moons bodie, to those to whom the Eclipse is Centroll, which notwithstanding may be something augmented by the refraction of the Suns beames in the Lunar Atmosphere.

But I have insisted too long on this Eclipse, especially it being visible in no part of *Europe*, *Asia* or *Africa*, the ancient known World. But I proceed to the second, whose calculation is this according to the former method.

Shakerley, 1651.

4 Octob. 1651.

	s.	Gr.	d.	h.	m.
The meane \angle of \odot & D at <i>London</i>	3	20	25	5	
The intervallum to be added		5	15	55	
The true conjunction	4	1	41	0	
The places of the Luminaries	6	20	58	32	
The meane Anomalie of \odot	3	16	33	24	
The meane Anomalie of D	2	11	8	27	
The mean motion of D s latitude	6	5	48	48	
The true motion of D s latitude	6	1	10	19	
The true latitude of D , South		0	6	7	
The Reduction subtracted			0	18	
The time of Reduction added			0	38	
The time of Conjunction corrected	4	1	41	38	
The equation of time add.			10	2	
The apparent time of true \angle	4	1	51	40	
The hourly motion of \odot			2	30	
The hourly motion of D			32	13	
The hourly motion of D from \odot			29	43	
The semidiameter of \odot			16	32	
The semidiameter of D			16	1	
The semidiam. of Residuall Circle			0	31	
The semid. of the Earths disce			57	17	
The semidiam. of the Penumbra			32'	33"	
The sum of the semidiameters	1	29	50		
The difference of the semidiameters		24	44		

The Latitude of the Moon added to the semidiameter of the Penumbra is $38^{\circ} 40''$ which being less then the semidiameter of the Earths disce, argues that all the Penumbra is contained within the disce or inlightned part of the Earth,

The

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The scruples of half the duration considered universally	1 29 37
The scruples of half the central Eclipse	56 56
The scruples of half the continuance of the penumbra upon the descent	23 58
The time of half the universal duration	3 0 57
The time of half the Central duration	1 52 58
The time of half the continuance	48 23

Therefore	
At Sunrise { beginning	3 22 50 43
{ Centrall Eclipse	3 23 58 42
{ End	4 1 3 17
At Sunfett { beginning	4 2 40 3
{ Centrall Eclipse	4 3 44 38
{ End	4 4 52 37

Having thus past through the general part of the Calculation, we now after the example of the last Eclipse come to determine

I. The place wherein the Sun appears Centrally Eclipsed in the Nonagesime degree of the Ecliptick.	0 1
The time apparent at <i>London</i> in degrees	27 58
The right ascension of Midheaven	235 48
The Moons Latitude South	6 7 11
The Altitude of the nonagesime degree	83 52
The point ascending	20 59
The Altitude of the south pole	11 30
The Oblique Ascension of the Horoscope	286 45
The right Ascension of Midheaven	196 45
The difference in Longitude West	39 3
So the Longitude inquired	345 17

II The place where the Eclipse begins at the Sunrise.	
The time apparent at <i>London</i> in degrees	342 47
The right ascension of midheaven	190 34
The moons Latitude north	1 41 11
The altitude of the nonagesime degree	89 0
The point ascending	30 59
The altitude of the north pole	33 0
The oblique ascension of the Horoscope	201 53
The right ascension of the midheaven	118 53
The difference in Longitude West	77 41
So the longitude inquired	106 39
III The	

Shakerley, 1651.

III. The place where the sun is centrally Eclipsed at his rising

The time apparent at <i>London</i> in degrees	359	49
The right ascension of midheaven	207	33
The Moons latitude South	9	11
The altitude of the Nonagesime degree	88	50
The point ascending	30	59
The altitude of the North pole	23	0
The oblique ascension of the Horoscope	208	53
The right ascension of Midheaven	112	51
The difference in longitude West	94	40
So the longitude inquired	289	40

I V. The place where the Eclipse ends at the Sunrising

The time apparent at <i>London</i> in degrees	15	49
The right ascension of Midheaven	213	42
The Moons latitude South	4	11
The altitude of the Nonagesime degree	80	38
The point ascending	29	59
The altitude of the North pole	31	0
The oblique ascension of the Horoscope	204	20
The right ascension of Midheaven	114	30
The difference in Longitude West	109	22
So the longitude enquired	274	58

V. The place where the Eclipse begins at the Sunrise.

The time apparent at <i>London</i> in degrees	41	0
The right ascension of Midheaven	247	54
The Moons latitude south	9	34
The altitude of the Nonagesime degree	68	34
The point ascending	20	59
The altitude of the south pole	1	0
The oblique ascension of the Horoscope	19	29
The right ascension of midheaven	289	29
The difference in longitude East	41	35
So the Longitude enquired	65	55

V I. The place where the sun is centrally Eclipsed at his setting.

The time apparent at <i>London</i> in degrees	56	10
The right ascension of midheaven	264	3
The Moons latitude south	11	21
The altitude of the Nonagesime degree	78	55
The point ascending	20	59
The altitude of the south pole	10	30
The oblique ascension of the Horoscope	20	54
The right ascension of midheaven	290	54
The difference in longitude East	26	51
		50

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So the Longitude enquired

51 11

VII. The place where the Eclipse ends at Sunsetting

The time apparent at <i>London</i> in degrees	73 9
The right ascension of midheaven	281 2
The moons latitude south	13 52'
The altitude of the Nonagesime degree	81 7
The point ascending	20 59
The altitude of the south pole	13 0
The oblique ascension of the Horoscope	291 16
The right ascension of midheaven	291 16
The difference in longitude East	10 44
So the longitude enquired	34 34

These Calculations will serve us as a compass and card to sayle by from our sea-included Iland over the vast Atlantick Ocean into those parts of *America* and *Africa* where the forementioned appearances of this solar Eclipse will be conspicuous. The Penumbra first enters upon the earth a little West from the Ile *Triango*, upon the North coast of the Ile *Cuba*, over against *Cavana* where the Eclipse begins at the Suns rise, from that place growing greater on by the Cape of *Florida*, and the Ilands in the *Mexican* gulie called *Tertugan*; near unto the Ile *Negros* the Eclipse appears centrall, the Sun then rising; from thence North Westward passing out of the gulfe into New *Spaine*, and following the course of the River *Esco*, into the Country *Terliebichimechi* enters New *Gyanada*, and in the southerly part thereof sets wholly upon the earths disc, the Eclipse then ending at the Sun rise: While the center of the Penumbra passing South East, travelleth along by the Northern parts of *Jucatan*, *Jamaica*, and about *Cariagena* enters upon *Castilia del oro*, and proceeding farther crosses the River *Orenoque*, and a little after comes to the Equinoctial line at the lake *Parime* in *Guiana*. Then about the City *Chrimos* situate upon the great River *Oregliana*, enters upon *Brasil*, and near to *Rio Reale*, a little West from *Cidade de Salvador*, the Sun is centrally Eclipsed in the Nonagesime degree of the Ecliptick from the Ascendent, a little before noon. Then leaving the continent of *America*, travels over the great Atlantick Ocean by the Ile of *Ascension*, and near the Cape *Caterina* enters upon the *African* deserts, and in the Kingdome of *Damunt* South from the Cite *Vamba*, presents those wild Inhabitants with the appearance of the Suns central Eclipse at his setting

ing, But the Inhabitants of *Montes Lune* and the Northern Territories of *Mozambique*, shall see the Sun set at the beginning of the Eclipse. Lastly the Penumbra by degrees leaving the Earth, and the Moon freeing her self from the Suns Centrall embraces, they take their last farewell in the *Ethiopian* sea about 200 leagues from the maine land of *Angola*, over against the Cape *Ledo*, the Eclipse and the day there ending together.

Yet as the former Eclipse, so neither will this anywhere appear totall, in regard the Moons apparent Diameter is less then the Suns according to those Tables we have proposed as our guides in the Calculation; So that the observation of these two Eclipses, if they may be had from such places where they are centrall, will be an excellent means for Astronomers, to try the truth of their dimensions of the Luminaries apparent bigness, this being the principall cause why contrary to the custome of ordinarie Ephemeridists, and perhaps further then the most part our English Calendariographers wil understand, I have pursued the former calculation. Weh though it point out no place in any part of *Europe*: yet, if duly understood, may be serviceable to others inhabiting in remoter places. And if any shall carp hereat, as reckoning it lost labour, to be so curious in describing those things which notwithstanding shall not come to our view, let them be pleased to consider that as it hath pleased God to bestow upon man the whole earth for his better convenience of living, thereby repaying the indigencie of one part with the plenty of another: So likewise was man bestowed upon the world, and reason upon man, to the end that thereby discovering the works of nature, he might be enabled to communicate the knowledge thereof to others, who perhaps enjoy not so great a benefit, and teach them to aspire to the principall end of their Creation, the praise and glory of the mighty Creator.

The description of these Eclipses thus finished, it will be perhaps expected that according to the use and custome of yearly writers, and the rules of that science, vulgarly cally Astrology, I should proceed to determine such future events as may happen thereafter. But to make my pen the perfect interpreter of my thoughts, I must force it to signifie thus much for me, that I either understand not the modern rules which lead us to this knowledge, or they are such as leave my reason unsatisfied. And though either of these may serve to excuse my silence in this, yet I shall further add this from the decrees of Astrologers themselves, *Eclipses nihil nocere, quibus non videntur*. And this consideration joyned with the former, will be a sufficient passport for my pen's neglect of a further inquiry into these uncertain contingencies.

But

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But you whom the sacred thirst of gaine, or the curious desire of strange spectacles, shall drive into those remote places where these Eclipses will be visible, you I desire in *Urania's* name and for her sake, not to neglect the opportunities nature her self presents you, of seeing the wonderfull workes of God in the heavens, as well as you do on the sea and land; and communicate your observations to our *European* Astronomers, for the rectification of that Science, whose imperfection so much incommodes your voyages. And then consider what aspiring endeavours these speculations will exact from your spirits, and how full of reason is this consideration of the divine Moralist *Boethius*.

*Quam varijs terras animalia permeant figuris !
Namq; alia extento sunt corpore, pulveremq; verrunt,
Continuamq; trahunt vi pectoris incitata sulum.
Sunt quibus alarum levitas vaga, verberetq; ventos,
Et liquido longi spacia ætheris enatet volatu.
Hæc pressisse solo vestigia, gressibusq; gaudent
Vel virides campos transmittere, vel subire sylvas.
Quæ varijs videas licet omnia discrepare formis,
Prona tamen facies hebetes valet ingravare sensus.
Unica gens hominum celsum levat altius cacumen:
Atq; levis recto stat corpore despicitq; terras.
Hæc, nisi terrenus male dispis, admonet figura;
Qui recto vultu Cælum peris, exerisq; frontem,
In subline seras animum quoq; ne gravata pessum
Inferior sidat mens corpore celsum levato.*

Consol Philos. lib. 5. mtr. 5.

What various figured Animals the earth doth bear!
Some scarcely from the dust their spacious bulks can reare,
But with their moving breasts continued furrowes score:
Which some with lighter wings through obvious winds do soar,
And in the liquid aire their nimble bodies move.
Some with thier humble steps the lowly earth do prove,
And fixing there their rest, delight to teach their pace,
Through solitary woods and verdant fields to trace.
Which though we all perceive in shape to disagree,
Yet by their downward look, their fences dulled be.
Onely mankind to things above can lift his eies,
And in erected posture things on earth despise.

This

Shakerley. 1651.

This figure will advise, unless on earth thou doat,
Thee, who canst raise thy lookes Celestial things to notes;
That thou shouldst lift thy mind on high, lest if not so,
The body mounting up, the spirit should stay below.

A short Astronomical discourse.

De Mercurio in Sole Videndo.

THe great Architick of the world draws Mankind by degrees into the knowledge of his workmanship. Those lucid globes that adorne the face of Heaven, were at first but accounted of two sorts, the greater the Sun and Moon; and the lesser the Stars; Long was it before the motions of the other five bodies, called Planets, were found to be different from the rest, and subject to that apparent irregularity we now admire in them. Long was it, yea even til this present age, before it was known that some of these had no less power, according to their greatness, then the Moon, to intercept the Suns light in his passage to us, and appear as a spot amongst his radiancy. But the late industry of the French Monsieur Gassende, and our English Mr. Horrox hath freed our judgements from that Peripatetick imposture, and drawn us to beleeve the Planets opacity.

The ingenuous Kepler by a publick Admonition desired all Astronomers to take notice of an appearance in the Suns bodie, viz. the passage of Mercury betwixt the eye and it; which afterwards fell out, and was accordingly observed by the above mentioned Gassendus, in October 1631. But whether that Admonition informed us any further of any such interception to happen in succeeding years, I know not in regard I have not seen it. But by the revolving of some Ephemerides I have seen, and frequent recourse to Astronomical Calculation, being fully confirmed that that Observation of *Mercurius* in Sole was not a solitary one, or excluded our seeing any other of the like nature; and that particularly besides some of late years since the observation of Gassendus which have been *Esus per comparanda* or very near it, there falls out one this present year 1651. I thought my self something obliged to be (*absque invidia*) a successor to the learned Kepler in admonishing of this Phenomenon those who delight in these present Travels, and studie to confine within their numeral enclosures the subtle extravagancies of this wavering Planet.

But it will not be a miss to dispute a little with the Peripateticks,

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rickes, the possibility of this appearance; lest that care we take in
 the Calculation thereof may seem to be frustrate. *Keckerman* in *Sy-*
stem Astron. pag. 291. contends that it is impossible for the infe-
 rior Planets, *Venus* and *Mercurie*, to eclipse the Sun. His reasons
 are, 1. Because they are nearer the Sun than the Moon is, and
 therefore can less hinder the Suns light, 2. The Moon is a dense
 body, but *Mercury* and *Venus* are subtle and rare, so that
 the suns beams may pass through them. 3. When *Mercurie* and *Ve-*
nus are in conjunction with the Sun, they are not conjoynd in a
 right line drawn from our eyes to their bodies, as the Moon is. For
 when *Mercurie* and *Venus* come to the Sun, they are found in their
Apogea or *Perigea*, in which places these Planets being constitu-
 ted, do deviate from the superficies of the Elliptick, and therefore
 cannot take from us the Suns aspect, who alwayes directly observes
 that path. And some saith he, add this reason for a fourth that
V and *Q* are very little bodies, and so cannot hinder us of the Suns
 view. Thus saith *Keckerman*. But *Longomontanus* moves a greater
 doubt concerning the native opacity of these Planets; *Theor.* lib. 2.
 cap. 18. without which they can never be seen in their inferior
 conjunctions with the Sun. His words are these, "*Viderint Opti-*
ci quidam seculi nostri, quo jure sydera reliqua ut Lunam, totum lumen
suum à sole mutuari satis audacter affirmant, et pro hac sua assertione
Venerem testem producant, quod ipsa pro visibili sua quantitate, in
maximis Elongationibus à Sole semiplena, instar Lune in Quadratu-
ra appareat: Quælis igitur in Solis fere copula? And a little after,
Ex hoc spectaculo concludi quidem arbitror, Solem ad siderum lumina
condensandum quando firmitus sub certo visionis angulo obtinui nostro
ostendantur, aliquid addere; at nunquam nisi Lume illud unice distri-
bueret, id quod etiam mysterio suo minime careret; nisi forte reliqua sy-
dera non ut Lunam, superficierentus, sed potius rædderent lumen à sole
haurire malimus; quod tamen Cometis propriam magis esse caudariam
vestigia ostendunt. The occasion of these words was given by two
 observations of *Venus* had by *Tycho* when she was near the Sun, and
 by consequence ought to have appeared less illustrated then at o-
 ther times, when as the contrary was observed.

But give me leave you grand interpreters of nature, thou studi-
 ous favorite of *Aristotle*, and thou ingenious follower of *Tycho*, a
 litle to examine your opinions; whose authority should prevail
 with me, if I had not learned from the two frequent lapses of o-
 thers, that reason is the onely impartial judge in controversies. The
 arguments of *Keckerman* are of very little validity. The first and
 fourth (being both one in effect, though it hath pleased him to
 make a distinction) affirme nothing but what will be granted, name-
 ly,

ly, that the inferiors by reason of their smallness and distance, cannot make any evident obscuration in the Suns bodie; but withall if *Keckerman* had been acquainted with the Telescope, and considered its power in the amplification of remote objects, he could not but acknowledge the weakness of this assertion. For the second which is the tenuity and rare tracticency of the Planetarie bodies, it is only said, not proved, nor indeed can be: It depends only on that erroneous position, that *Stella est densior pars sui Orbis*, held by *Aristotle* lib. 2. cap. 7. de *Caelo* and fully confuted by these new appearances which perswade us there are no solid Orbes at all; evidences whereof may be seen in Cap. 1. of my discourse of the Systeme of the world, published the last year. For the third Argument, it depends upon the verity of the *Ptolemaick* Hypothesis, and those monstrous fabricks of Epicycles there imagined, which at this time shall receive from my Pen no other confutation, then what the second and third Chapters of my aforesaid discourse hath already bestowed on them.

But we come to *Longomontanus*, who after the invention of the Telescope, had not withstanding, rather distrust his own eyes, then the certainty of *Tycho's* annotation; and cannot beleeeve that a Planet so little illuminated should appear so great and glorious. But it were to be wisht if he were yet alive, he had the opportunity to behold this one experiment. Choose a winter night as convenient for your purpose as you can, an aire calm, clear, and free from unquiet disturbances of rising or falling vapors: and set up a candle the diameter (or rather breadth) of whose flame is perfectly known; and then recede from it so far, that the flame, according to the principles of Geometrie, should be in appearance diminished to a certain quantity, suppose the half: you shall plainly perceive that it doth not onely retaine its just quantity, but on the contrary acquires a greater, though more confused, and dim, and also degenerates from its Pyramidal figure into an Orbicular. And what accident befalls this that doth not to Venus when she is near the Sun? Or rather how doth not this appearance emulate that other? But the Telescope cutting off those adventitious raies and airy appendices, is the onely true meanes we have of measuring the diameters of this and the other Planets. And if this will not please *Longomontanus*, let him tell me why this Planet Venus appears in the day time, so far short of her nocturnall bigness, or why shee doth not like the Moon retain her just quantity. Nay let him take paper perforated with the point of a small needle, & through that hole observe the Stars or Planets, he wil easily perceive, how much they will loose of their borrowed radiancy in that narrow passage.

But

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But I have been too tedious, in regard that what we contend about, hath been already performed in both the Inferiours, by the above named *Gassendus*, and *Horrox*, whose happie and succesful industry hath made way for others, to enter into these Starry paths, and from the sacred bosome of the Sun, to draw these his running companions, and engage them by leaving their accustomed arts and deceits, to acknowledge themselves subjects to the divine *Urania*: Go on then you curious eyes, contemplators of the wonders of Nature; advance your selves to the speculation of these Celestial rarities, and make your selves worthy of that Encomium of the Poet, *Ovid. fest. lib. i.*

We now come to the Calculation of this Mercurial Eclipse; which if our narrow roome would have permitted, we had presented according to the tables of *Ptolemie*, *Alphonſus*, *Rheinboldus*, *Longomontanus*, *Argol*, and *Lansberg*, but finding them so erroneous in that of *Gassendus*, to which this hath a great affinity. I have been the rather drawn to neglect those celebrated Hypotheses, vitious in their very forme, and incapable of Emendation, and to proceed to those who have found out that the Planets moved not in a Circular, but an Ecliptick line, the undoubted path of their motions; and first for *Kepler*, according to whose Rudolphine tables this Conjunction happens

Octob. 23. d. 17. hor. 48. min. P.M. time equi.
which is thus proved,

	fig.	0	1	4
The mean motion of the Sun	7	12	20	18
His Apogæum	3	6	36	18
The mean anomalie	4	5	44	0
The equation subt.		1	41	50
The Suns true place	7	10	38	28
His distance from the earth		98	976	
The mean motion of Mercurie	1	22	22	10
His Aphelium	8	14	18	34
The mean Anomalie	5	8	3	36
The equation of the eccentric subt.		11	45	0
The eccentric place	1	10	37	10
The Node Ascendent	1	13	37	34
The argument of Latitude	11	26	59	36
The Reduction add.			1	18
His true place from the Sun	1	10	38	28
His distance from the Sun		31	576	
His Latitude South			10	19
According to <i>Kepler</i> <i>Mercurie</i> enters upon the Suns bodie a-				
above				

about half an houre past three in the morning the 24 day, and departs from it a little before eight; so that if these tables represent this appearance truly, it is not impossible, but that it may exhibit it self to us here in England towards the latter end. I am confident this is not far from the truth, though it cannot be expected that he who never observed *Mercurie* in that part of his Orbe where this Conjunction happens, could give to the world so true an account of his steps as those who have had the benefit of this appearance. 'Tis not one age, much less one man, that is able to effect the perfect restauration of the Celestial motions; But rather to be wondred at, that from so few and inconvenient Observations, he was able to predict that of *Gassendus* with so little error.

But I come to the *Philolaick* tables of *Bullialdus*, of whom if my judgement may be taken for current, we may better rely for the certainty of this appearance, according to whom this Conjunction happens,

Octob. 23. d. 13. h. 23 m. P.M. time app.

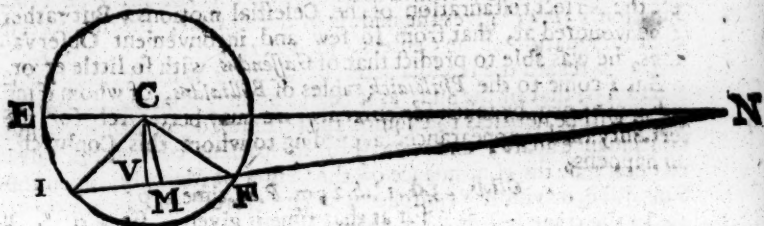
for at that time is given

	deg.	0	1	2
The mean motion of the Sun	7	12	8	33
His apogæum	3	6	33	36
The mean anomalie	4	5	34	57
The Equation subt.		1	41	0
The Suns true place	7	10	27	33
His distance from the earth			98990	
The mean motion of <i>Mercury</i>	1	21	35	1
His Aphelium	18	13	6	15
The mean anomalie	5	8	28	56
The equation of the Eccentrick subt.		11	8	58
The Eccentrick place	1	10	26	3
The Node ascendent	1	13	51	32
The argument of Latitude	11	26	34	34
The reduction add.			1	29
His true place from the Sun	1	10	27	33
His distance from the Sun			31228	
His Latitude South			11	9

At this time also the Semidiameter of the Sun is by the Tables of *Bullialdus* 16' 38". And the Semidiameter of *Mercury*, is by the observation of the aforesaid *Gassendus* 10". This not differing from it so much in positure as to make any sensible alteration. Nor need this be questioned as short of the truth, for all the dimensions that either *Tycho* or *Lansberg* have made thereof, if we consider what erroneous grounds they used, and how careless they were of that imposture of the aire, which made them appear so much greater

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er then their iust quantity. Neither can these 3 Objections of *Schickard* in his *Response to Gassendus*, any way trouble our process, for if we grant what he says to be true, (which nevertheless will scarcely be granted) yet we use onely its apparent bigness, *Sub Sole*, without respect had to any Opticall or accidental contractions. Therefore to determine the duration of this rare and admirable Eclipse, we premise this figure, whereby the passage may be seen over the Suns body.



Let *C* represent the center of the Sun; *FEI* his visible body, *ECN* a portion of the Ecliptick, *IFN* a portion of the orb of Mercurie; *N* the Node; *CN*, the distance of the Node from the place of the true Conjunction; *I* the beginning of the Eclipse; *M* the middle; *F* the end; *V* the true Conjunction in respect of the Ecliptick; *CV* the Latitude of Mercurie at the true Conjunction; *CM* the least distance of their Centers; whence we proceed in manner following;

In the Triangle *VCN* are given

VCN a right angle

CN distance of ☿ from the Node of ♄

CV the Latitude of Mercurie

Therefore the angle *CNV*

whereto *VCN* is equal

In the Triangle *VCN* are given

VNC are right angle

VCN found as before

CV the latitude as before

Therefore the side *VM*

And the side *CM*

The daily motion of the Sun direct

of Mercurie in the ecliptick retrograde

therefore of Mercury from the Sun

which gives the hourly motion

But this hourly motion of Mercury from the Sun being taken

0	1	0
90	0	0
3	24	6
	11	9
3	7	35
90	0	0
3	7	35
	11	9
	0	37
	11	7
1	0	18
1	18	10
3	18	28
	5	46

Shakerley, 1651.

in respect of the Ecliptick, will not serve for our purpose, we must inquire that motion which Mercury makes apparently in his own Orbe, to which end in the Triangle $V C N$ are given

$V C N$ a right angle	90 0 0
$C N$ the hourly motion in the Ecliptick	5 46
$C N V$ the angle before found	3 7 35
Therefore $V N$ the hourly motion in the Orbe	5 48
by which dividing $V M$	0 37

the quotient is $6' 23''$ which added to the time of the true Conjunction $13h. 23'$ gives the middle of the Eclipse, or the nearest appropinquation of the Centers $13h. 29' 23''$

But in regard the semidiameter of Mercury is so little in proportion to that of the Sun, as it beares not any sensible part thereof, it will be needless to enquire the scruples of incidence and continuance apart, and we will for the present content ourselves to determine the continuance of the Center of Mercury, upon the Suns disc, or visible Hemisphere. Therefore

In the triangle $I M C$ are given	90 0 0
$I M C$ a right angle	90 0 0
$C M$ the least distance of the Centers	11 7
$C I$ the Semidiameter of the Sun	16 38

Therefore $I M$ is found $12 22$ which divided by the hourly motion of Mercury from the Sun, $5' 48''$ gives the time of half the Central duration $2h. 7' 56''$; wherefore

The Central ingress <i>Octob. 23.</i>	11 21 37
The middle of the Eclipse	13 29 23
The Central Egress	15 37 19
The Central duration	4 15 52

If this Calculation be true and certain, (as indeed I do much confide in it) we in England shall in-vain expect any thing of this appearance; It being rather to be seen by our Antipodes, the Islands of *Solomon*, the Kingdome of *China*, the straits of *Anian* and the parts adjacent. I have wholly neglected the Parallax of Mercury from the Sun, because in a business of so little concernment, I would not stand upon idle curiosities, which in this latter age have contributed something to the expence of much precious time, and in part verified that of the Poet, *Sannazaro in Arcad. Egloga 6.*

Hor conosco ben, to che'l mondo instabile,

Tanto peggior è più, quanto più invetera.

This fond instable world too well we know,

The older 'tis, the worse it still doth grow.

These Eclipses although indeed very rare, and seldome observ-
ed

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ed, may notwithstanding be hoped for in our time, more then once, according to the computation of the aforementioned *Bullialdus*. For by his Tables the diurnal motion of the Sun is $59^{\circ} 8' 19'' 42'''$ of Mercury $4^{\circ} 5' 32'' 35''' 29''' 34''' 36'''$; Therefore the diurnal motion of Mercury from the Sun is $34^{\circ} 6' 24'' 51''' 47''' 32'' 55'$. Also the diurnal motion of the Node of Mercury, $15^{\circ} 42' 5' 41''$, and therefore of the Sun from the Node, $59^{\circ} 8' 3'' 59'' 56' 0''$ and these give the time of restitution of Mercury to the Sun in daies, and sexages: $55^d 52' 18'' 15''' 6'''$ and of the Sun to the Node of Mercury $6^d 54' 16'' 8''' 37''' 48'''$. But in regard the place of the Retrograde conjunction falling near either of the Nodes, may produce this appearance, we need onely to use the half of this restitution which is $3^d 24' 38'' 4''' 18''' 54'''$. The Periods or Apocatastases of these two, would require a large number of years far beyond the age of the world. But remitting that curiosity to those who are at leasure, we will content our selves with such as are within more narrow limits. A fitter falls not out then that which happens after eleven restitutions of Mercury to the Sun. For one restitution of Mercury to the Sun, $55^d 52' 18'' 15''' 6'''$ being eleven times repeated, makes $21^d 14^h 35^m 20^s 46''' 6'''$; which multiplied by the diurnal motion of the Sun from the Node of Mercury, $59^{\circ} 8' 3'' 59'' 58' 0''$, gives in motion $20^d 36^h 12^m 7^s 5''' 2' 27'' 28'''$, wanting of three Zodiackes and a half $3^d 47' 52'' 54''' 57''' 32'' 32'''$; which in this business is but a little and soon past over. Or which in effect is all one; if we multiply half of the restitution of the Sun to the Node of Mercury, which is $3^d 24' 11'' 4''' 38''' 54'''$ by seven the product is $21^d 20^h 36^m 30^s 12''' 18'''$, whose difference from the former times is $5^d 51^h 9^m 26''' 12'''$. And this is the nearest Apocatastasis, we have of these two restitutions, considered onely in their mean motions; yet something variable, by reason of the inequality of motion in these two Planets, the earth and Mercury; which for the future I leave to be found by the Calculator: this that hath been delivered, being a sufficient ground for Astronomers whereon to proceed further, and too much for those that are not.

It cannot be denied that though there were nothing considerable in this Eclipse, but the sight of so rare a spectacle, it would sufficiently merit our regard, and invite us to the observation of it. But when we consider the excellent use thereof for restoring the motions of that Planet, we cannot chuse but entertain this newes far more pleasingly. When we see the imitation we have taught Art to make of Nature in the forming of Artificial Rainbowes, Comets or the like; or when we behold the admirable structure

of Geometrical Propositions, founded upon common and obvious Axiomes, we cannot but wonder at the happy success of Art. But when we observe the use of these in our humane affaires, and what great commodities they afford us, we no longer confine our delights within its narrow limits, but strive to make our conceits profitable as well as pleasant. So it is in this Eclipse which, besides the content, the sense receives in the appearance, presents the understanding with these advantages.

First, it is a singular help for discovering, and determining, the Quality or dimension of the Orbe of Mercury in respect of its own parts: For since it is not denyed by any but those that celebrate the cadaverous reliques of the ancient Orbes, that the Orbe of Mercury is not purely circular but contracted into an Eclipse, the first step into the knowledge of that Planets motions, must be by determining his eccentricity, or the distance of the center from the *Umbilicum* or Focus of the Ellipsis, which is best performed by such observations as this. And that in regard that here the Planet is exempted from the Parallax of the Orbe, or that second inequality occasioned by the motion of the earth, which at this time is in one right line with the Sun and the Planet. For those other determinations proceeding from observations of the inferiours in their greatest Elongations though ingenious in themselves, and full of Geometrical subtilty, can scarcely be certain and true, in regard the line of Vision falls so obliquely on the Orbe of the Planet, and moreover depends on the places of the fixed stars, whose certainty may be doubted, and also the second inequality before spoken of, perpetually perplexing the former with incredible variety. But here none of these doubts are to be feared; it being in our power without suspicion of error, to determine the Longitude, and Latitude to any necessary exactness. And from hence at several observations (if they may be obtained) as the learned *Balladius* did by the Achronical positures of the Superiours) may we proceed to the enquiry of the Eccentricity, the place of the Aphelium, and the mean motion.

Secondly, the proximity or nearness of Mercury to the earth, and his convenient positure to the Sun, presents us another advantage. For hereby it is evident, that one minute in the true Longitude of Mercury in his Orbe, alters his apparent place, about the fourth part of a minute. So that on the contrary, if it be granted us, to observe his apparent place to the fourth part of a minute (which may be easily done by the wayes I shall shew anon) we may determine to a minute his place in the orbe, which exactness cannot be had by any other observation; in regard that

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at other times near his greatest Elongations, where he is most frequently and with least error observed, for the most part a whole degree in the Orbe, varies his apparent place in the Ecliptick insensibly.

Thirdly, from this observation, may we more accurately limit the Node of Mercury then from any other. In regard that Mercury being in his inferiour conjunction with the Sun, and therefore near the earth presents us a great visible inclination of his Orbe to the Ecliptick. For though that which he hath in the Sun be greater, in regard he is nearer the Sun, then the earth, yet presents he to us the greatest apparent inclination we can see him in, except in his inferiour conjunction we should suppose him in his Aphelium, and the earth in her Perihelium. And therefore he being in this observation, near the Node in which place alone, he is visible *Sub Sole*, his latitude varies with an unusual celerity; so that to one degree of Longitude there answers about 15 minuts of Latitude. Therefore if we be certain of the observed Latitude to one fourth part of a minute, we may determine the place of the Node to a minute. An exactness, never hitherto attained by any Astronomer before the observation of *Gassendus*; as it is sufficiently evident, not onely in their discordance from that observation, but their continual dissent one from another. Add hereunto the certainty of the observing by the Telescope above other instruments, for that it depends not on the ambiguous Latitude of the fixed stars, but respects the Sun it self, which still preserves his Annual course unchanged, and never deviates from the Ecliptick.

And fourthly, there is no way of equal certainty with this in measuring the diameter of Mercury. For when we look upon him *Sub dio*, with our bare eyes, he appears to be what he was called, *viz, Sisyur*, glorious in his borrowed lustre, and by an incredible dilatation of light, perswades our sence, he is bigger then our Reasons finde him. But the Telescope deprives this father of *Amolycus* of his stolne Varnish, and faithfully affords us his true shadow upon the suns disce, idolized in any necessary quantity: Whereby without fear of error, or danger of fallacie, is offered an exact comparison of the diameters of the Sun and Mercury.

Other things concerning this matter might have been added, but I have exceeded my bounds.

Therefore to observe this Eclipse, you must provide your self of a large dark roome, the wals not too white, make a hole through the wall, in which place the Telescope so as the Suns beams

Shakerley, 1651.

beams may pass through it, then place a plane of wood or other solid substance, and paste thereon a white paper; on it draw a Circle of what convenient bigness you please, but so as the Suns beames passing through the telescope, may fall on the paper at right angles, of such a largeness as that the Circumference, may be divided into 360 degrees after the usual names; Then letting the Suns beames exactly fill up the Circle, which must be perpendicular to the Horizon, you shall see any thing that interposeth betwixt you and the Sun; so by this means and the help of a corrected watch or instrument, you may observe the time of the beginning and end of this ☿ ☉ ♀.

JEREMY SHAKERLEY.

FINIS.